

The Level of Depression, Parental Involvement and Nicotine
Dependence in Adolescent Cigarette Smokers

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Abstract

Currently in the United States, tobacco use is the leading cause of preventable death and disability (Youth Tobacco Cessation Collaborative [YTCC], 2000). Tobacco use is also a significant risk factor for many cancers, cardiovascular disorders, lung diseases, and also contributes to a number of other chronic diseases such as diabetes. There are currently 4 million smokers under the age of 18 in the United States and approximately 3,000 who become regular smokers each day. It is also estimated that 5 million adolescents will die prematurely from a tobacco related illness, that is, if current trends continue (YTCC, 2000).

There is also good evidence that smoking levels among adolescents carry over into adult life (Burt & Peterson, 1998). About 82% of adults who have ever been daily smokers have tried their first cigarette before 18 years of age (YTCC, 2000). Also, adolescents who successfully avoid becoming regular smokers when they are young have less of a chance of becoming a regular smoker later in life (Burt & Peterson, 1998). Therefore, a reduction in adolescent smoking rates has the possibility to have a significant long-term impact on overall smoking rates and also the morbidity and mortality associated with tobacco use.

Many adolescent tobacco users would like help and support to quit smoking and feel they cannot quit on their own (YTCC, 2000). There have been many research studies done on the prevention of adolescent smoking but very little has been published on adolescent smoking cessation (Burt & Peterson, 1998). The research that has been done in this area is limited and very preliminary in nature. Support of the effectiveness of specific cessation interventions, such as behavioral and pharmacological therapy is needed (YTCC, 2000). Therefore, a better understanding of adolescent cessation

behavior is critical to help develop effective programs that help adolescents quit smoking before they become long-term adult users (Burt & Peterson, 1998).

Review of Literature

Selected Factors Influencing Adolescent Cigarette Smokers

There are multiple factors that contribute to adolescent smoking. Narrowing and isolating specific variables may help to identify a framework for future cessation strategies. Information about why an adolescent smokes is imperative when trying to help them stop. Therefore, several variables that could be of interest in adolescent smoking are depression, nicotine dependence, and parental supervision and attitude towards drugs. Therefore, these variables will be studied in the context of a pilot intervention study whose purpose was to test a school-based smoking cessation intervention, with use of behavioral counseling and pharmacotherapy.

Depression. Recent studies have indicated that there is a link between depression and smoking among adolescents (Albers, 2002). In several studies, being an established smoker at baseline was the strongest predictor of developing depressive symptoms (Albers, 2002). In addition, many researchers have noted a higher level of depression among smokers in comparison to nonsmokers (Tomori, Zalar, Kores Plesnicar, Zihlerl, Stergar, 2001). In another study, depressive symptoms were found to predict continued smoking, though it was still unclear whether the depression inhibited the quit attempt or increased the relapse probability after the quit attempt (Zhu, Sun, Billings, Choi, Malarcher, 1999). Other findings are that depression is a strong risk factor for smoking initiation (Fleming, Kim, Harachi, Catalano, 2002), and a change in cigarette status affects the teenage depression level (Patten, Ames, Ebbert, Wolter, Hurt, Gauvin, 2001). The depression findings indicate that there is a link between smoking and depression in adolescents but the association is unclear. Further research must be conducted to clarify this relationship.

Nicotine Dependence. The Surgeon General's report of 1988 came to the conclusion that all cigarettes and other tobacco products are addicting and that the addiction is caused by nicotine (USDHHS, 1988). Psychoactive effects with alterations in mood, behavior and/or cognition, highly controlled or compulsive use that is driven by strong urges, and reinforcing effects that maintain self-administration of the drug are the primary criteria for addiction (USDHHS, 1988). Another identified characteristic of addiction is having great difficulty in achieving voluntary long-term cessation, even when the user is motivated to stop (Kalant, Clarke, Corrigan, Ferrence, Kozlowski, 1989). The development of nicotine withdrawal symptoms, which may include depressed mood, irritability, insomnia, anxiety, difficulty concentrating, restlessness, decreased heart rate, and increased appetite, are indicators of physical dependence (APA, 1994). It has been reported that 70% of the 50 million smokers in the United States have made at least one prior quit attempt and approximately 46% attempt to quit each year. This fact provides evidence that nicotine dependence is a chronic condition and has been recognized as such. It is one that often requires repeated intervention (CDC, 1997). Drug pharmacodynamics along with psychosocial and cultural reactions to a drug which influence its use are all within a biobehavioral framework of addiction (Kozlowski Henningfield, Brigham, 2001).

Parental Supervision and Attitude towards Drugs. Over the past several decades, parental style has been recognized to have a large impact on adolescents' participation in health risk behaviors (Stanton, Li, Galbraith, Cornick, Fiegelman et al, 2000). Many factors contribute to parenting style and its impact on adolescent risk behavior, but one of them is parental monitoring or supervision. Parental supervision can serve as a preventative measure or an intervention, if the adolescent already engages in risky behavior (Stanton et al, 2000).

Among younger adolescents it has been found that smoking cessation had more to do with parental than peer influences, therefore relapsers were more likely to have a parent who smoked (Myers, 1999). The style of parenting is a significant risk factor for smoking initiation in adolescents (O'Byrne, 2002). This study also found that a balance of autonomy and intimacy is the best parenting style to prevent smoking. In addition, family bonding and parental support are protective factors against teen smoking (Fleming et al, 2002). It was reported that if a parent smokes and then stops it greatly increases the likelihood of their teen child quitting (Distefan, Gilpin, Choi, Pierce, 1998). Therefore, parental attitude and supervision greatly impact both the initiation of adolescent smoking and the ability for them to stop smoking.

Methods

Research Questions

The area of adolescent smoking is starting to become a more researched topic. If smoking cessation occurs early in the smoking trajectory, there is a possibility to save many lives and expenditures including healthcare. Despite the recent attention, though, there are still many gaps in the literature, including, individual factors that may lead to smoking or prevent cessation. More research in these areas needs to be done as well as research on what helps adolescents quit smoking and how to better tailor smoking cessation programs.

This is a secondary analysis of a study that used a one group repeated measures design to pilot a smoking cessation intervention with a group of high school student cigarette smokers. The purpose of that study was to determine the feasibility of a school-based tobacco cessation intervention with adolescent smokers including an 8-week program of nicotine replacement and bupropion SR pharmacotherapy in combination with weekly one-to-one behavioral intervention. The research questions of the secondary analysis are:

1. What is the level of self-reported depression symptoms at baseline measurement among adolescent cigarette smokers?
2. For those students with information beyond baseline, were there changes in depression symptomatology at the 8-week interval?
3. What is the teenager's perception of parental supervision and parental attitude toward drugs at baseline?
4. What is the extent of exposure to cigarette smoking in the adolescent's home and social settings at baseline?
5. What is the relationship between nicotine dependence and level of depression?

Sample

The target population for this study was adolescents enrolled in a selected high school in central Ohio. The subjects were recruited primarily through a sign-up program during the student's monthly "activity period." Snowball technique also occurred as students described the program to their friends, and teachers also referred several students to become involved. In order to enroll, students were between the ages of 15 through 18, had smoked regularly for six months or longer and were enrolled in the selected high school. Parent informed consent as well as youth assent were obtained according to both Children's Hospital and The Ohio State University Offices of Research Risk and Protection. Subjects were excluded if they had an acute medical illness, pregnancy (as determined by urine HCG testing), regular use of psychotropic drugs, clinical diagnosis of depression, or alcohol or drug abuse. In addition, bupropion was not prescribed to the adolescent if they had a history of a seizure disorder.

This was a feasibility pilot study, therefore power analysis was not utilized. The goal for participation was 30 adolescents in order to obtain a sample with diversity.

Procedure

Human Subjects. The proposal was reviewed and approved by Children's Hospital and The Ohio State University Research Risk and Protection Offices. The parents completed an approved written informed consent, and adolescents filled out a youth assent form. The protection of privacy was ensured through the use of numbers, rather than names, to identify data.

Method of Data Collection. After the student met the inclusion criteria and written parental consent and youth assent were obtained, baseline data collection was conducted. This included sociodemographic information about the subject as well as baseline measurements in depressive symptomatology, smoking history, nicotine dependence, and the adolescents' beliefs about smoking. Established scales such as Fagerström Test for Nicotine Dependence (Heatherton, Kozlowski, Frecker, Rickert, Robinson, 1989) and the Centers for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) were used. Personal smoking history and parent smoking pattern were collected using instruments pre-tested with youth. Teenager's perception of parental involvement was also assessed with an established instrument. This broad assessment was done at baseline, 8 weeks, and at the 3 month follow-up after enrollment. In addition, 8-week and 12-week carbon monoxide (CO) levels in exhaled air and salivary cotinine samples were obtained. Cotinine is the major metabolite of nicotine with a half-life of 18-20 hours (Pomerleau, Pomerleau, Majchrzak, Kloska, Malakuti, 1990).

An advanced practice nurse who was also a doctoral student trained in treating tobacco use and dependence conducted the weekly behavioral intervention as well as monitored the medication combination used. Private office space in the administrative suite of the high school was provided for these individual appointments with students. For the behavioral intervention, the advance practice nurse held weekly meetings at the school with the subjects in order to assess current cessation status, answer any

questions, educate on tobacco, discuss problem-solving strategies, and deal with any concerns the subjects might be having. The students were also placed on 8 weeks of nicotine replacement therapy (patch) and/or bupropion SR if not contraindicated. Nicotine gum was provided to manage break-through craving. Pediatrician, Judith Groner, prescribed the medication regimen for each participant. Medications were dispensed in a 2-week supply and potential side effects were monitored weekly with assessment of blood pressure, heart rate, CO level, unprotected sex and alcohol use. Bupropion was not prescribed for participants who reported binge drinking because of possible reduced seizure threshold. Smoking abstinence at 4 and 8 weeks and 3 month follow-up were confirmed with carbon monoxide in exhaled air being <8ppm (Society for Research on Nicotine and Tobacco [SRNT], 2002).

Internal Validity. Internal validity refers to the possibility that variables in a study influence each other to the extent that the results of the study are not a reflection of reality (Polit & Hungler, 1999). In this pilot study, there is a potential threat to internal validity. This threat is in the testing method. The fact that there are a series of tests throughout the study is of concern because previously receiving the same instrument could lead to changing attitudes towards the instrument, thus affecting the results. Since this study would be difficult to complete without the use of self-report, sensitization can be controlled by only using most of the instruments once at baseline and then using time (8 weeks) before employing the measure, such as CES-D again. Time may reduce any effects of sensitization that occurred through the first use of the instrument.

External Validity. The term external validity simply refers to the possibility of the study results being generalized to a larger population. The goal of most research is to reveal relationships across populations so that the understanding of the variable improves, thus the condition for which it is being studied improves. A threat to external validity in this study is the Hawthorne effect. The Hawthorne effect refers to participants

acting a certain way simply because they are in a study. This could be a problem if the behavior only occurred because it was in a research context, the results may not be able to be generalized in a more natural setting (Polit & Hungler, 1999).

Another threat to external validity is selection. The sample that was collected in the original study was not random but self-enrolled in one high school with a 40% smoking prevalence. There is no way to know that this population of 15-18 year olds interested in participating in a smoking cessation project accurately reflects the 15-18 year old population of cigarette smokers at large. But, in combination with the demographic data there is the possibility to understand what populations this study does apply to and the opportunity to potentially apply the results with a population that is similar outside of the sampling frame.

Measurement effects may also be a threat to external validity. The amount of data that was collected, including pretest information, background data and other self-report methods, may make the results non-applicable to another group that were not exposed to the same data collection methods (Polit & Hungler, 1999). This may make generalizing this study to other populations difficult. But, again, a goal of this project was to aid in the identification of school-based cessation strategies that work for adolescents. So, if it is found significant that behavioral and pharmacological therapy is effective in this population, then every adolescent who enrolls in a cessation program could possibly experience this same brief data collection method at baseline.

Operational Definitions and Instruments

Demographic Form. A demographic form was used to assess sample characteristics (Appendix A). This form provides information on the sociodemographic data of the participants (Table 1). It also provided a baseline assessment of smoking history (age of initiation, cigarettes per day, previous quit attempts), the adolescent's level of cotinine, as well as access to cigarettes.

Table 1

Demographic Characteristics and Smoking History (n=23)

Age (in years)	Median 17.5	Range 16-19
Gender	16 males (69.5%)	7 females (30.4%)
Employed	Part-time 61%	Not employed 30%
Access to Cigarettes	Easy 87%	Not easy 13%
Age of initiation (in years)	Mean 11.3	Std. Dev. 2.39
Cigarettes/Day	Mean 21.7	Std. Dev. 7.74
Number of Quit Attempts	Median 2	Range 0-6
Cotinine Level (in ng/ml)	Mean 129.3 (no outlier)	Std. Dev. 60.6 (no outlier)

Depression. Most people experience temporary feelings of sadness or "the blues," which are normal responses to life events (American Psychiatric Association [APA], 2000). Major depression, though, is a biochemically-mediated syndrome in which the individual remains in a constant state of dysphoria regardless of environmental circumstances. According to the DSM-IV-TR, dysphoric mood must be present along with at least four of the following symptoms; sleep problems, appetite disturbances, fatigue, inappropriate guilt, decreased concentration, psychomotor agitation, and/or suicidal ideation. It is necessary to have these symptoms for at least two weeks in order to be diagnosed as clinically depressed (APA, 2000). Depression, in this study, was measured by the Center for Epidemiologic Studies Depression Scale (CES-D) which was developed in order to assess the symptomatology of depression in the general population (Radloff, 1977). This 20-item instrument has a 4-point Likert response scale ranging from 0 (rarely) to 3 (most of the time). The participants rate the severity of their

depressive symptoms on that scale. The summative scoring of this 20-item instrument has a possible range of 0-60, with lower scores reflecting lesser amounts of depressive symptomatology. Though the instrument was not designed for clinical diagnosis, it is based on symptoms of depression seen in clinical cases. Coefficient alpha in various studies were 0.80 and higher, and moderate test-retest reliability ranging from $r = 0.51$ to 0.67 at 2 and 4 week intervals, respectively (Radloff, 1977). The validity of the CES-D is supported through its discrimination between psychiatric inpatients and the general population. The CES-D scores increased 1 week after smoking cessation and then returned to baseline in adults that did not have a lifetime history of depression (Niaura, Britt, Borelli, Shadell, Abrams, et al, 1999). In comparison, the CES-D scores remained stable from baseline and then increased after acute nicotine withdrawal resolved in adults with a history of depression (Niaura et al, 1999).

Nicotine Dependence. The 1988 Surgeon General's report concluded that tobacco products and cigarettes are addicting and that nicotine causes the addiction (USDHHS, 1988). Nicotine dependence can be measured by utilizing the Fagerström Test. The original Fagerström Tolerance Questionnaire (Fagerström, 1978) has been modified resulting in the Fagerström Test for Nicotine Dependence (FTND; Heatherton et al, 1989 & 1991). The 6-item instrument has 4 dichotomous responses (scored 0 or 1) and 2 items with 4 responses scored 0 to 3. Potential total scores range from 0 to 10 with higher scores indicating greater dependence. A score of 5 is considered medium dependence, while 6 to 7 is classified as high dependence (Fagerström, Heatherton & Kozlowski, 1992). Revisions in scoring and elimination of two of the original items yielded internal consistency of 0.61 compared to the original instrument of alpha coefficient of 0.48 (Heatherton et al, 1989). The FTND items loaded on a single factor with only 3 items loading <0.30 . Significant correlations between plasma cotinine levels and FTND ranging from $r = 0.33$ to 0.51 in different samples support the validity of the

instrument (Pomerleau et al, 1990). In particular, the item assessing time to first cigarette after waking dichotomized at less than and greater than 30 minutes yielded significantly ($p = 0.01$) higher cotinine concentrations in those smoking within the first 30 minutes after awakening (303 ng/ml) compared to those smoking their first cigarette after 30 minutes (199 ng/ml).

Cigarette Exposure. The extent of cigarette smoking that the adolescent is exposed to in the home environment as well as in peer groups is the participant's self-report of other smokers in the house and social groups. Several questions were devoted to estimate the extent of the adolescent's exposure in the home to cigarette smoking including the participant's siblings' ages and their smoking status, and the smoking status of the participant's mother and father. Questions about best friend's smoking status and the participant's estimate of smoking prevalence in their peers were also included.

Parental Supervision and Attitude towards Drugs. Over the past several decades, parental style has been recognized to have a large impact on adolescents' participation in health risk behaviors (Stanton et al, 2000). In this study, parental supervision was determined by 4 items with a Likert scoring system with four possible answers to each question, 1 (most supervised) to 4 (least supervised). The sum of responses is the final score with higher scores indicating less supervision. Similarly, there are 3 items that assess for the teenager's perception of their parent's attitudes towards drugs. This also uses a Likert system with 4 possible responses, 1 (not upset) to 4 (very upset). Therefore, after the sum of the 3 items, the higher scores suggest stronger parental anti-drug attitudes. All of the items used were from a subscale of The National Youth Survey from the Centers for Substance Abuse Prevention (CSAP).

Results

Research Question 1: What is the level of self-reported depression symptoms at baseline among adolescent cigarette smokers?

This question relates to the level of depression symptoms that the adolescent reported to the researcher at baseline through the CES-D questionnaire. Statistical analysis of this interval level data included mean, standard deviation, and range of scores for the CES-D (Table 2). A cut point of greater than 16 indicates at risk for depression.

Table 2. *Depression scores among adolescent cigarette smokers (n=19)*

	Mean	Median	Standard Deviation	Range
CES-D score	21.3	20	7.4	9-40

Note. The questionnaire contains 20 items reported on frequency scale of 0 (never) to 3 (always)

Research Question 2: Were there changes in depressive symptomatology at the 8-week interval for those with information beyond baseline?

This research question determined if there were any changes, either improvements or regressions, in depressive symptomatology from baseline to 8-weeks (end of smoking cessation treatment). A descriptive analysis describing the mean, standard deviation and range of depressive symptoms at baseline and at 8-weeks as well as a paired t-test comparison of scores at baseline and 8-weeks indicated relatively high average depression score and no significant changes over the 8-week treatment period. Of the 8 adolescents that were tested for depression at both the baseline and 8-week interval, 6 quit smoking. Three who quit remained at the same depression level, while two of the adolescent's scores went down indicating less depressive symptomatology, and the score of one participant increased. The depressive scores

increased from 19 to 28, and 17 to 31, in the two students who did not quit smoking at the 8-week follow-up. Averages are presented in Table 3.

Table 3. *Depression scores at baseline and 8-weeks (n=8)*

Collection time	Mean	Standard Deviation
Baseline	19.1	5.95
8-weeks	19.8	8.33

Note. The questionnaire contains 20 items reported on frequency scale of 0 (never) to 3 (always)
Paired T-test outcome: $t=0.212$, $p>0.05$

Research Question 3: What is the teenager's perception of parental supervision and parent's attitude towards drugs at baseline?

This research question deals with the teenager's perception of parental involvement at baseline of the study. This is a descriptive analysis measured with two scales looking at parental supervision of the youth and parental drug attitude. For the parental supervision, the statistical analysis employed mean, standard deviation, and range for the sum of 4 items with a 4-point Likert scale response. For the parental drug attitude, the statistical analysis also used mean, standard deviation, and range for the sum of 3 items in the scale obtained from the Centers for Substance Abuse and Prevention (CSAP) National Youth Survey (Table 4 and Figures 1 & 2). These scores represent mid-range on both of the variables.

Table 4. *Descriptive data of parental supervision (n=23) and parental drug attitude(n=22)*

Scale	Mean	Standard Deviation	Range
Parental Supervision ^a	8.25	2.48	4-14
Parental Attitudes toward child's drug use ^b	7.82	2.46	3-12

^aThe parental supervision is 4 items reported on frequency scale of 1 (most supervised) to 4 (least supervised). Higher scores indicate less supervision.

^bThe parental attitude is a 3 item scale of 1 (least strict on drug use) to 4 (most strict on drug use). Higher scores suggest parents have stronger anti-drug attitudes.

Figure 1. *Percentages of parents by score on parental supervision (n=23)*Figure 2. *Percentages of parents by score on parental attitude toward child's drug use (n=22)*

Research Question 4: What is the extent of exposure to cigarette smoking in adolescent's home and social settings at baseline?

This research question employs a self-report of other smokers the adolescent is in contact with at home and in peer group. Therefore descriptive analysis was employed including the mean, standard deviation, and range of the number of smokers the adolescent (aged 15-19) is in contact with at home or in his/her peer group. On average there were 1.9 smokers in the home with a standard deviation of 1.0 and a range of 1 to 3. Best friends were the largest cigarette exposure source with 70% of participants reporting best friends smoked, followed by 65% of mothers smoking. Lastly, about 41% of adolescents reported a father that smoked (Figure 3).

Figure 3. *Percentages of participants reporting cigarette smokers in parents and best friend (n=23)*

Research Question 5: What is the relationship between nicotine dependence and depression level in adolescent cigarette smokers?

This research question is inquiring whether or not nicotine dependence is related to adolescent depression level. Therefore, a Pearson correlation analysis was completed to assess the significance, direction and magnitude of the relationship. The closer to 1.0 the Pearson r is, the more the two variables are related. A negative value would indicate an inverse relationship (Munro, 2001). There was a non-significant relationship between nicotine dependence (FTND) and depression (CES-D) (Table 5).

Table 5. *Correlation between Nicotine Dependence and Depression level*

<i>Variable</i>	<i>Depression score</i>
<i>Nicotine dependence score</i>	$r=0.196$, $p=0.435$

Discussion

The results of the baseline CES-D, with a median of 20 and a mean of 21.3, indicate that there was moderate level of depressive symptoms in adolescents at the beginning of this study. A score of 16 or above represents the cut-point for being at risk for depression. These adolescents were mostly all at a point of concern, clinically speaking. The range of scores is from 9-40, so these adolescents represent a wide variety of depressive symptomatology.

A depression score was also derived for those that had information beyond baseline. An 8-week CES-D showed that the mean depression scores were 19.8, whereas the baseline average was 19.1 for those students with information beyond baseline. A paired t-test determined that there was no significant difference in depression symptoms at these two time points. But, of the 8 students who completed both the baseline and 8-week CES-D test, 25% of them had a decrease in depressive symptomatology after quitting smoking, around 37% remained the same after quitting, only 12% increased their depression level after quitting. The students who did not quit smoking both had relative increases in their depression screen. This information correlates with previous studies that demonstrate there is a link between depression and smoking status (Albers, 2002). Though this link is still unclear, there were definite changes in the symptomatology for both the teenagers that quit and those who did not quit. Also of note, the two highest depression levels in the study belonged to the adolescents who did not quit smoking. Their scores indicate a correlation that is in

congruence with the study that smokers have a higher depression level in comparison to non-smokers (Tomori et al, 2001).

Conversely, these findings are not in complete congruence with studies that have shown that a change in cigarette smoking status affects the teenage depression level (Patten, 2001). Among 37% of the teenager's who quit smoking, depression levels remained unchanged. Nevertheless, this was a small sampling and results may not be representative of the average population of teenagers who smoke. A question that still remains is, what is the precise link between adolescent smoking and depression? Are the adolescents who continue to smoke cigarettes and had an increase or no movement on their depression score self-medicating their depressed mood? It is undetermined if smoking preceded the depressive symptoms or vice versa. This link must be clarified in order to tailor intervention programs to fit adolescent needs. If depression is found to be a significant risk factor for the initiation of smoking, then cessation strategies can be tailored to always address this issue, as well as offer treatment for depression in conjunction with their quitting regimen. After this study, it is increasingly apparent that more studies must be completed on this specific variable, as well as others, in relation to smoking so that a more definitive result can be recognized and treatment of adolescent smokers can be adjusted accordingly.

Parental supervision was also measured with a mean of 8.25 on a scale with a range of 4 (highly supervised) to 14 (not supervised). This mean demonstrates a moderate amount of supervision for these adolescents. Parental attitude toward drug use was measured with a mean of 7.25 on a scale with a range of 1 (least strict on drug use) to 12 (most strict on drug use). So, again, this variable seems to be a more moderate level of strictness on their adolescent's drug use. Studies show that parental supervision and attitude can serve as a preventative measure, if the adolescent already engages in a risky behavior (Stanton et al, 2002). Another study suggests that a balance

between autonomy and intimacy with a strong sense of family bonding is the best parenting style to prevent smoking (Fleming et al, 2002). The amount of supervision and parental style is a significant risk factor for initiation of smoking in adolescents (O'Byrne, 2002). In this study, the results are at a moderate level of supervision. It would seem that these parents have, for the most part, an accurate view of the appropriate amount of supervision. Perhaps, more studies need to be done to assess the smoking habits and cessation abilities of teenager's with parents at both ends of the supervision spectrum. This may lead to increased insight into the actual importance of parental supervision in the ability of their teenager to stop smoking. It is possible in this study that the teenagers who were most likely to quit had the moderate level of supervision, and the ones that were not successful in quitting had parents at the more extreme ends. Either way, more research needs to be done as to the exact effect, if any at all, that parental supervision and attitude have on the adolescent smoker and smoking cessation success.

One study on parental involvement and peer influences showed that the time that adolescents spend with family, especially on the weekends, can reduce or even eliminate the influence that peers have with any negative behavior, including smoking (Warr, 1993). Clinically, this information could be very useful when instructing parents about their child's smoking habits. By relaying this information to parents, it seems possible to help them understand ways in which peer influences to smoke can be reversed, or at least lessened.

The next research question dealt with the extent of the exposure to cigarette smoking that the adolescent had in their home and social settings. This question analyzed the percentages of participants with mothers, fathers, and best friends who smoked cigarettes. Around 65% reported that their mothers smoked, 41% of their fathers smoked, and 70% reported that their best friends smoked. These results conclude that participants had considerable exposure to smoking by others in their environment.

Friends were a major influence on the smoking status of the teenagers in this study and the majority of student smokers had a mother who was also a smoker. These findings are consistent with studies that show that parental smoking (especially maternal) has a major impact on the initiation and ability to quit smoking, but as the adolescent gets older, it is the friends who smoke that have the more major effect (Myers, 1999). It is possible that in this study, because it deals with older adolescents (15-19 years), that some of the teenagers could have initiated smoking because of the influence of their mother and then continued because of their friends. This would explain the similarity in the percentage of friends and mothers smoking. This is a very interesting variable because it shows the drastic effect that close relations' smoking status has on the adolescent and their ability to quit. More studies need to be completed with this variable focusing on the ability of adolescent to quit when those around them smoke as well.

The fifth, and final, research question examined the correlation between nicotine dependence and depression level. Were adolescents that were more dependent on nicotine more depressed? The correlation in this analysis was not significant. However, it could be the case that the negative effects of nicotine withdrawal may have increased the adolescent's depression level. The results may be the opposite of the question asked. It is possible that the adolescents who were attempting to quit may have had comparable depression levels because of the negative effects of quitting. It has also been shown that repeated intervention may be necessary and addiction is very hard to break (CDC, 1997). Therefore, more interventions and research must be completed in this population that focus more directly on why the adolescent is depressed. Are they depressed because of the withdrawal symptoms or because they cannot quit?

A study on the vulnerability of young adults to tobacco marketing brought up an interesting variable that needs to be researched more fully in the future. This study demonstrated that the age group of 18 to 30 years was more likely than older adults to

smoke only occasionally and usually consume less than 10 cigarettes per day (Biener & Albers, 2004). This reveals that this age group is at a transition period where they will either stop smoking or they will firmly establish their smoking habit. This study also showed that this age group is more likely to be in places where tobacco promotion takes place, for example bars or clubs. If tobacco companies are unimpeded by regulation, there is likely to be an increase in adult smoking prevalence. This study further exhibits the need for clinicians to intervene with adolescents at a young age when specific interventions may be more useful in later years when they must decide whether to maintain their smoking habit and firmly establish it, or become a nonsmoker.

A clinical implication that can be gained from this study is that a holistic approach to adolescent cigarette cessation is imperative. The clinician needs to recognize the importance that teenager's close relations has on his/her ability to stop smoking. It may be necessary that the adolescent include their close contacts to be treated as well as themselves. Clinicians may also need to venture out in the community more and focus interventions on groups of adolescents and their families, aiming at getting the adolescent to quit smoking, as well as their families and friends. Clinicians may also generate a list of recommendations to offer the parent/guardian of an adolescent smoker. Such suggestions could include activities that would strengthen family bonding and encourage time to be spent together every weekend. Through this study it has become increasingly more apparent that the clinician must involve both the family and best friend in the smoking cessation process. It is clear that adolescent smoking is a very complex issue with many factors involved. It is through holistic care that takes into consideration all of these variables that an adolescent may be able to stop smoking with the help of their clinician and support systems.

More research in this area is needed to determine relationships between specific variables. This will enable clinicians to develop programs that will help

adolescents quit. Adolescents want to quit and have asked for assistance in order to succeed (YTCC, 2000). Healthcare professionals must respond to this plea with more research and focused interventions in order to decrease the number of teenage smokers as well as to improve the health of future generations.

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